AMENDMENTS TO THE CLAIMS

The following is a complete list of all claims in this application. Please **AMEND** claims 83, 88, 89, 94, 117, 123, 152, 153, 155, and 158 as shown below. Please **CANCEL** claims 86, 87, 99, 101-103, 105-109, 113, 116, 119-122, 126, 128-130, 133-136, 140-141, 154, 157, 159-160, and 164-179 without prejudice or disclaimer. Please **ADD** new claims 180-247 as listed below.

1-82. (Cancelled).

83. (Currently Amended) An apparatus for converting source data to a channel-modulated signal having a plurality of pairs of in-phase (I) and quadrature-phase (Q) data in a mobile station, wherein the mobile station uses (N-1) data channels (N is an integer larger than two) and a control channel, the apparatus comprising:

channel coding means for encoding the source data to generate (N-1) data parts and a control part, wherein the data parts are allocated to the data channels and the control part is allocated to the control channel;

code generating means for generating spreading codes to be allocated to the channels, wherein each of the spreading codes is selected on the basis of a data rate of the data part and the control part and spreading codes are selected so that two consecutive pairs of the I and Q data are correspondent to two points located on the same point or symmetrical with respect to a zero point on a phase domain; and

spreading means for spreading the control part and the data part by using the spreading codes to thereby generate the channel-modulated signal,

wherein:

the code generating means includes:

control means responsive to the spreading factor for generating code numbers for the channels; and

spreading code generation means responsive to the spreading factor and the code number for generating the spreading code to be allocated to the channels,

the spreading code generation means includes:

counting means for consecutively producing a count value in synchronization with a clock signal;

first spreading code generation means responsive to the count value and the spreading factor for generating the spreading codes to be allocated to the data channels; and

second spreading code generation means responsive to the count value and the spreading factor for generating the spreading code to he allocated to the control channel,

the spreading codes correspond to an orthogonal variable spreading factor (OVSF) code,

the spreading code allocated to the control channel is represented by $C_{256,0,}$ where 256 denotes the spreading factor and 0 the code number,

the spreading codes allocated to first and second data channels are represented by $C_{4,1} = \{1, 1, -1, -1\}$,

when there are more than two data channels, the spreading codes allocated to a third data channel and, when present, a fourth data channel are represented by $C_{4,3} = \{1, -1, -1, 1\}$, and

when there are more than four data channels, the spreading codes allocated to a fifth data channel and, when present, a sixth data channel are represented by $C_{4,2} = \{1, -1, 1, -1\}$.

84-87. (Cancelled).

88. (Currently Amended) The apparatus as recited in claim [[87]]83, wherein the first spreading code generation means includes:

first logical operation means responsive to the count value for carrying out a logical operation with the spreading factor and the code number related to a data part, to thereby generate the spreading code related to the data part; and

first selection means for outputting the spreading code related to the data part in response to a select signal as the spreading factor related to the data part.

89. (Currently Amended) The apparatus as recited in claim [[87]]83, wherein the second spreading code generation means includes:

second logical operation means responsive to the count value for carrying out a logical operation with the spreading factor and the code number related to the control part, to thereby generate the spreading code related to the control part; and

second selection means for outputting the spreading code related to the control part in response to a select signal as the spreading factor related to the control part.

90. (Previously Presented) The apparatus as recited in claim 89, wherein said second logical operation means receives a code number of $I_7I_6I_5I_4I_3I_2I_1I_0$, a count value of $B_7B_6B_5B_4B_3B_2B_1B_0$ and a predetermined spreading factor.

91. (Previously Presented) The apparatus as recited in claim 90, wherein the second logical operation means carries out a logical operation of $\prod_{i=0}^{N=2} {}^{\oplus} I_i \bullet B_{N-1-i}$ if the predetermined spreading factor is 2^N where N is 2 to 8.

92. (Previously Presented) The apparatus as recited in claim 88, wherein said first logical operation means receives a code number of $I_7I_6I_5I_4I_3I_2I_1I_0$, a count value of $B_7B_6B_5B_4B_3B_2B_1B_0$ and a predetermined spreading factor.

93. (Previously Presented) The apparatus as recited in claim 92, wherein the first logical operation means carries out a logical operation of $\prod_{i=0}^{N=2} {}^{\oplus} I_i \bullet B_{N-1-i}$ if the predetermined spreading factor is 2^N where N is 2 to 8.

94. (Currently Amended) The apparatus as recited in claim [[87]]<u>83</u>, wherein said counting means includes an 8-bit counter when the 2^N is a maximum spreading factor.

95. (Cancelled).

96. (Previously Presented) The apparatus as recited in claim 88, wherein said first logical operation means includes a plurality of AND gates and a plurality of exclusive OR gates.

97. (Previously Presented) The apparatus as recited in claim 88, wherein said first selection means includes a multiplexer.

98-116. (Cancelled).

117. (Currently Amended) A method for converting source data to a channel-modulated signal having a plurality of pairs of in-phase (I) and quadrature-phase (Q) data in a mobile station, wherein the mobile station uses (N-l) data channels (N is an integer larger than two) and a control channel, the method comprising the steps of:

a) encoding the source data to generate (N-l) data parts and a control part, wherein the data parts are allocated to the data channels and the control part is allocated to the control channel;

b) generating spreading codes to be allocated to the channels, wherein each of the spreading codes is selected on the basis of a data rate of the data part and the control part and spreading codes are selected so that two consecutive pairs of the I and Q data are correspondent to two points located on the same point or symmetrical with respect to a zero point on a phase domain; and

c) spreading the control part and the data part by using the spreading codes to thereby generate the channel-modulated signal,

wherein:

<u>step a) includes the steps of:</u>

<u>a1) encoding the source data to generate the data part and the control part; and</u>

<u>a2) generating a spreading factor related to the data rate of the data part,</u>

<u>step b) includes the steps of:</u>

<u>bl) generating code numbers for the channels in response to the spreading factor; and</u>

b2) generating the spreading code to be allocated to the channels in response to the spreading factor and the code number,

step b2) includes the steps of:

b2-a) producing a count value in synchronization with a clock signal; and

b2-b) carrying out a logical operation with the spreading factor and the code number related to the data part and the control part in response to the count value, to thereby generate the spreading code related to the data part,

the spreading codes correspond to an orthogonal variable spreading factor (OVSF) code,

the spreading code allocated to the control channel is represented by $C_{256,0}$, where 256 denotes a spreading factor and 0 [[a]] the code number,

the spreading codes allocated to first and second data channels are represented by $C_{4,1} = \{1, 1, -1, -1\}$,

when there are more than two data channels, the spreading codes allocated to a third data channel and, when present, a fourth data channel are represented by $C_{4,3} = \{1, -1, -1, 1\}$, and

when there are more than four data channels, the spreading codes allocated to a fifth data channel and, when present, a sixth data channel are represented by $C_{4,2} = \{1, -1, 1, -1\}$.

118-122. (Cancelled).

123. (Currently Amended) The method as recited in claim [[122]]117, wherein the code number and the count value are represented by an 8-bit signal of $I_7I_6I_5I_4I_3I_2I_1I_0$ and an 8-bit signal of $B_7B_6B_5B_4B_3B_2B_1B_0$, respectively.

124. (Previously Presented) The method as recited in claim 123, wherein the logical operation is accomplished by $\prod_{i=0}^{N=2} {}^{\oplus} I_i \bullet B_{N-1-i}$ if the spreading factor is 2^N where N is 2 to 8.

125-151. (Canceled).

152. (Currently Amended) An apparatus for converting source data to a channel-modulated signal having a plurality of pairs of in-phase (I) and quadrature-phase (Q) data in a mobile station, wherein the mobile station uses (N-1) data channels (N is an integer larger than two) and a control channel, the apparatus comprising:

channel coding means for encoding the source data to generate (N-1) data parts and a control part, wherein the data parts are allocated to the data channels and the control part is allocated to the control channel;

code generating means for generating spreading codes to be allocated to the channels, wherein each of the spreading codes is selected on the basis of a data rate of the data part and the control part and spreading codes are selected so that two consecutive pairs of the I and Q data are correspondent to two points located on the same point or symmetrical with respect to a zero point on a phase domain; and

spreading means for spreading the control part and the data parts by using the spreading codes to thereby generate the channel-modulated signal,

wherein:

the spreading codes correspond to an orthogonal variable spreading factor (OVSF) code,

said channel coding means includes spreading factor generation means for generating a spreading factor related to the data rate of the data part,

the spreading code allocated to the control channel is represented by $C_{256,0}$, where 256 denotes the spreading factor and 0 the code number,

the spreading codes allocated to first and second data channels are represented by $C_{4,1}$ = {1, 1, -1, -1}, [[and]]

said code generating means includes control means responsive to the spreading factor for generating code numbers for the channels, and spreading code generation means responsive to the spreading factor and the code number for generating the spreading code to be allocated to the channels, said spreading code generation means including, counting means for consecutively producing a count value in synchronization with a clock signal, first spreading code generation means responsive to the count value and the spreading factor for generating the spreading code to be allocated to the data channel, and second spreading code generation means responsive to the count value and the spreading factor for generating the spreading code to be allocated to the control channel, and

the second spreading code generation means includes:

second logical operation means responsive to the count value for carrying out a logical operation with the spreading factor and the code number related to the control part, to thereby generate the spreading code related to the control part; and

second selection means for outputting the spreading code related to the control part in response to a select signal as the spreading factor related to the control part.

153. (Currently Amended) The apparatus as recited in claim 152, wherein the first spreading code generation means includes:

first logical operation means responsive to the count value for carrying out a logical

operation with the spreading factor and the code number related to the data part, to thereby generate the spreading code related to the data part; and

first selection means for outputting the spreading code related to the data part in response to a select signal as the spreading factor related to the data part,

and wherein said first logical operation means receives a code number of $I_7I_6I_5I_4I_3I_2I_1I_0$, a count value of $B_7B_6B_5B_4B_3B_2B_1B_0$ and a predetermined spreading factor.

154. (Cancelled)

155. (Currently Amended) The apparatus as recited in claim [[154]]152, wherein said second logical operation means receives a code number of $I_7I_6I_5I_4I_3I_2I_1I_0$, a count value of $B_7B_6B_5B_4B_3B_2B_1B_0$ and a predetermined spreading factor.

156. (Previously Presented) The apparatus as recited in claim 155, wherein the second logical operation means carries out a logical operation of $\prod_{i=0}^{N=2} {}^{\oplus} I_i \bullet B_{N-1-i}$ if the predetermined spreading factor is 2^N where N is 2 to 8.

157. (Cancelled)

158. (Currently Amended) The apparatus as recited in claim [[157]]153, wherein the first logical operation means carries out a logical operation of $\prod_{i=0}^{N=2} {}^{\oplus} I_i \bullet B_{N-1-i}$ if the predetermined spreading factor is 2^N where N is 2 to 8.

159-160. (Cancelled)

161. (Previously Presented) A method for converting source data to a channel-modulated signal having a plurality of pairs of in-phase (I) and quadrature-phase (Q) data in a mobile station, wherein the mobile station uses (N-1) data channels (N is an integer larger than two) and a control channel, the method comprising the steps of:

a) encoding the source data to generate (N-1) parts and a control part, wherein the data parts are allocated to the data channel and the control part is allocated to the control channel;

b) generating spreading codes to be allocated to the channels, wherein each of the spreading codes is selected on the basis of a data rate of the data part and the control part and spreading codes are selected so that two consecutive pairs of the I and Q data are correspondent to two points located on the same point or symmetrical with respect to a zero point on a phase domain; and

c) spreading the control part and the data part by using the spreading codes to thereby generate the channel-modulated signal,

wherein the spreading code is an orthogonal variable spreading factor (OVSF) code and the spreading code allocated to the control channel is represented by $C_{256,0}$, where 256 denotes spreading factor and 0 the code number,

the spreading codes allocated to first and second data channels are represented by $C_{4,1}$ = {l, 1, -1, -1}, and

said step a) includes:

al) encoding the source data to generate the data part and the control part; and

a2) generating a spreading factor related to the data said step b) including,

b1) generating code numbers for the channels in response to the spreading factor; and

b2) generating the spreading code to be allocated to the channels in response to the spreading factor and the code number, said step b2) further including:

b2-a) producing a count value in synchronization with a clock signal; and

b2-b) carrying out a logical operation with the spreading factor and the code number related to the data parts and the control part in response to the count value to thereby generate the spreading code related to the data part.

162. (Previously Presented) The method as recited in claim 161, wherein the code number and the count value are represented by an 8-bit signal of $I_7I_6I_5I_4I_3I_2I_1I_0$ and an 8-bit signal of $B_7B_6B_5B_4B_3B_2B_1B_0$, respectively.

163. (Previously Presented) The method as recited in claim 162, wherein the logical operation is accomplished by $\prod_{i=0}^{N=2} {}^{\oplus} I_i \bullet B_{N-1-i}$ if the spreading factor is 2^N where N is 2 to 8.

164-179. (Cancelled)

180. (New) A spreading method for a mobile station, wherein the mobile station uses at least three data channels to be spread by one or more orthogonal variable spreading factor codes each having a spreading factor of four and at least one control channel, comprising:

spreading a first one of the data channels by $C_{4,1}$;

spreading a second one of the data channels by $C_{4,1}$; and

spreading a third one of the data channels by $C_{4,3}$; wherein

the mobile station uses the data channels such that when the mobile station uses three and not more than three of the data channels, the first one of the data channels, the second one of the data channels, and the third one of the data channels are used, and

$C_{I,K}$ represents an orthogonal variable spreading factor code, with I being a spreading factor and K being a code number, wherein $0 \leq K < I$.

181. (New) The method of claim 180, wherein

using the data channels includes spreading the data channels by the one or more orthogonal variable spreading factor codes.

182. (New) The method of claim 181, further comprising:

spreading the at least one control channel by $C_{256,0}$.

183. (New) The method of claim 182, wherein

the mobile station uses the data channels such that at least the first one of the data channels and the third one of the data channels are coupled to an in-phase branch, and

the mobile station uses the data channels and the at least one control channel such that at least the second one of the data channels and the at least one control channel are coupled to a quadrature-phase branch.

184. (New) The method of claim 182, further comprising:

allocating the first one of the data channels and the third one of the data channels to an in-phase branch, and

allocating the at least one control channel and the second one of the data channels to a quadrature-phase branch.

185. (New) The method of claim 180, further comprising:

when the mobile station uses more than three of the data channels, spreading a fourth one of the data channels by $C_{4,3}$, wherein

the mobile station uses the data channels such that when the mobile station uses four and not more than four of the data channels, the first one of the data channels, the second one of the data channels, the third one of the data channels, and the fourth one of the data channels are used.

186. (New) The method of claim 185, further comprising:

spreading the at least one control channel by $C_{256,0}$.

187. (New) The method of claim 186, wherein

the mobile station uses the data channels such that at least the first one of the data channels and the third one of the data channels are coupled to an in-phase branch, and

the mobile station uses the data channels and the at least one control channel such that at least the second one of the data channels and the fourth one of the data channels and the at least one control channel are coupled to a quadrature-phase branch.

188. (New) The method of claim 186, further comprising:

allocating the first one of the data channels and the third one of the data channels to an in-phase branch; and

allocating the second one of the data channels and the fourth one of the data channels and the at least one control channel to a quadrature-phase branch.

189. (New) The method of claim 185, further comprising:

when the mobile station uses more than four of the data channels, spreading a fifth one of the data channels by $C_{4,2}$; and

when the mobile station uses more than five of the data channels, spreading a sixth one of the data channels by $C_{4,2}$, wherein

the mobile station uses the data channels such that when the mobile station uses five and not more than five of the data channels, the first one of the data channels, the second one of the data channels, the third one of the data channels, the fourth one of the data channels, and the fifth one of the data channels are used, and

the mobile station uses the data channels such that when the mobile station uses six of the data channels, the first one of the data channels, the second one of the data channels, the third one of the data channels, the fourth one of the data channels, the fifth one of the data channels, and the sixth one of the data channels are used.

190. (New) The method of claim 189, wherein

using the data channels includes spreading the data channels by the one or more orthogonal variable spreading factor codes.

191. (New) The method of claim 190, further comprising:

spreading the at least one control channel by $C_{256,0}$.

192. (New) The method of claim 191, wherein

the mobile station uses the data channels such that at least the first one of the data channels and the third one of the data channels are coupled to an in-phase branch;

the mobile station uses data channels and the at least one control channel such that at least the second one of the data channels and the at least one control channel are coupled to a quadrature-phase branch.

193. (New) The method of claim 192, wherein

the mobile station uses the data channels such that the fourth one of the data channels is coupled to the quadrature-phase branch.

194. (New) The method of claim 193, wherein

the mobile station uses the data channels such that the fifth one of the data channels is coupled to the in-phase branch, and

the mobile station uses the data channels such that the sixth one of the data channels is coupled to the quadrature-phase branch.

195. (New) The method of claim 191, further comprising:

allocating the first one of the data channels and the third one of the data channels to an in-phase branch; and

allocating the at least one control channel and the second one of the data channels to a quadrature-phase branch.

196. (New) The method of claim 195, further comprising:

allocating the fourth one of the data channels to the quadrature-phase branch.

197. (New) The method of claim 196, further comprising:

allocating the fifth one of the data channels to the in-phase branch, and

allocating the sixth one of the data channels to the quadrature-phase branch.

198. (New) The method of claim 182, further comprising:

generating $C_{4,1}$ and $C_{4,3}$.

199. (New) The method of claim 191, further comprising:

generating $C_{4,1}$, $C_{4,3}$, and $C_{4,2}$.

200. (New) A spreading method for a mobile station, wherein the mobile station uses at least three data channels to be spread by one or more orthogonal variable spreading factor codes each having a spreading factor of four and at least one control channel, comprising:

allocating first data to a first one of the data channels;

allocating second data to a second one of the data channels;

allocating third data to a third one of the data channels;

spreading the first data by $C_{4,1}$;

spreading the second data by $C_{4,1}$; and

spreading the third data by $C_{4,3}$, wherein

when the mobile station uses three and not more than three of the data channels, the first one of the data channels, the second one of the data channels, and the third one of the data channels are used, and

$C_{I,K}$ represents an orthogonal variable spreading factor code, with I being a spreading factor and K being a code number, wherein $0 \leq K < I$.

201. (New) The method of claim 200, wherein

using the data channels includes spreading the data channels by the one or more orthogonal variable spreading codes.

202. (New) The method of claim 201, further comprising:

allocating control data to the at least one control channel; and

spreading the control data by $C_{256,0}$.

203. (New) The method of claim 202, wherein

the mobile station uses the data channels such that at least the first one of the data channels and the third one of the data channels are coupled to an in-phase branch, and

the mobile station uses data channels and the at least one control channel such that at least the at least one control channel and the second one of the data channels are coupled to a quadrature-phase branch.

204. (New) The method of claim 202, further comprising:

allocating the first one of the data channels and the third one of the data channels to an in-phase branch, and

allocating the at least one control channel and the second one of the data channels to a quadrature-phase branch.

205. (New) The method of claim 200, further comprising:

allocating fourth data to a fourth one of the data channels; and

spreading the fourth data by $C_{4,3}$, wherein

the mobile station uses the data channels such that when the mobile station uses four and not more than four of the data channels, the first one of the data channels, the second one of the data channels, the third one of the data channels, and the fourth one of the data channels are used.

206. (New) The method of claim 205, further comprising:

allocating control data to the at least one control channel; and

spreading the control data by $C_{256,0}$.

207. (New) The method of claim 206, wherein

the mobile station uses the data channels such that at least the first one of the data channels and the third one of the data channels are coupled to an in-phase branch, and

the mobile station uses data channels and the at least one control channel such that at least the second one of the data channels and the fourth one of the data channels and the at least one control channel are coupled to a quadrature-phase branch.

208. (New) The method of claim 206, further comprising:

allocating the first one of the data channels and the third one of the data channels to an in-phase branch; and

allocating the second one of the data channels and the fourth one of the data channels and the at least one control channel to a quadrature-phase branch.

209. (New) The method of claim 205, further comprising:

allocating fifth data to a fifth one of the data channels;

allocating sixth data to a sixth one of the data channels;

spreading the fifth data by $C_{4,2}$; and

spreading the sixth data by $C_{4,2}$, wherein

the mobile station uses the data channels such that when the mobile station uses five and not more than five of the data channels, the first one of the data channels, the second one of the data channels, the third one of the data channels, the fourth one of the data channels, and the fifth one of the data channels are used, and

the mobile station uses the data channels such that when the mobile station uses six of the data channels, the first one of the data channels, the second one of the data channels, the third one of the data channels, the fourth one of the data channels, the fifth one of the data channels, and the sixth one of the data channels are used.

210. (New) The method of claim 209, wherein

using the data channels include spreading the data channels by the one or more orthogonal variable spreading factor codes.

211. (New) The method of claim 210, further comprising:

allocating control data to the at least one control channel; and

spreading the control data by $C_{256,0}$.

212. (New) The method of claim 211, wherein

the mobile station uses the data channels such that at least the first one of the data channels and the third one of the data channels are coupled to an in-phase branch;

the mobile station uses the data channels and the at least one control channel such that at least the second one of the data channels and the at least one control channel are coupled to a quadrature-phase branch.

213. (New) The method of claim 212, wherein

the mobile station uses the data channels such that the fourth one of the data channels is coupled to the quadrature-phase branch.

214. (New) The method of claim 213, wherein

the mobile station uses the data channels such that the fifth one of the data channels is coupled to the in-phase branch, and

the mobile station uses the data channels such that the sixth one of the data channels is coupled to the quadrature-phase branch.

215. (New) The method of claim 211, further comprising:

allocating the first one of the data channels and the third one of the data channels to an in-phase branch; and

allocating the at least one control channel and the second one of the data channels to a quadrature-phase branch.

216. (New) The method of claim 215, further comprising:

allocating the fourth one of the data channels to the quadrature-phase branch.

217. (New) The method of claim 216, further comprising:

allocating the fifth one of the data channels to the in-phase branch, and

allocating the sixth one of the data channels to the quadrature-phase branch.

218. (New): The method of claim 202, further comprising:

generating $C_{4,1}$ and $C_{4,3}$.

219. (New) The method of claim 211, further comprising:

generating $C_{4,1}$, $C_{4,3}$, and $C_{4,2}$.

220. (New) A mobile station, wherein the mobile station is configured to use a plurality of data channels to be spread by one or more orthogonal variable spreading factor codes each having a spreading factor of four and at least one control channel, comprising:

means for allocating first data to a first one of the data channels, second data to a second one of the data channel, third data to a third one of the data channels, fourth data to a fourth one of the data channels, fifth data to a fifth one of the data channels, sixth data to a sixth one of the data channels, and control data to the at least one control channel, respectively;

means for spreading the first data by $C_{4,1}$, the third data by $C_{4,3}$, the fifth data by $C_{4,2}$, the second data by $C_{4,1}$, the fourth data by $C_{4,3}$, the sixth data by $C_{4,2}$, and the control data by $C_{256,0}$, wherein

the first one of the data channels, the second one of the data channels, and the third one of the data channels are configured to be used when three and not more than three of the data channels are used,

the first one of the data channels, the second one of the data channels, the third one of the data channels, and the fourth one of the data channels are configured to be used when four and not more than four of the data channels are used,

the first one of the data channels, the second one of the data channels, the third one of the data channels, the fourth one of the data channels, and the fifth one of the data channels are configured to be used when five and not more than five of the data channels are used,

the first one of the data channels, the second one of the data channels, the third one of the data channels, the fourth one of the data channels, the fifth one of the data channels, and the sixth one of the data channels are configured to be used when six of the data channels are used, and

$C_{I,K}$ represents an orthogonal variable spreading factor code, with I being a spreading factor and K being a code number, wherein $0 \le K < I$.

221. (New) The mobile station of claim 220, wherein

the mobile station is configured to use the data channels such that the data channels are spread by the one or more orthogonal variable spreading factor codes.

222. (New) The mobile station of claim 221, further comprising

means for generating $C_{4,1}$, $C_{4,2}$, $C_{4,3}$, and $C_{256,0}$.

223. (New) An apparatus for a mobile communication system, wherein the apparatus is configured to use one or more data channels to be spread by one or more orthogonal variable spreading factor codes each having a spreading factor of four and at least one control channel, comprising:

a first spreading unit configured to spread a first one of the data channels by $C_{4,1}$;

a second spreading unit configured to spread a second one of the data channels by $C_{4,1}$;

a third spreading unit configured to spread a third one of the data channels by $C_{4,3}$;

a fourth spreading unit configured to spread the at least one control channel by $C_{256,0}$, wherein

the first one of the data channels, the second one of the data channels, and the third one of the data channels are configured to be used when three and not more than three of the data channels are used, and

$C_{I,K}$ represents an orthogonal variable spreading factor code, with I being a spreading factor and K being a code number, wherein $0 \leq K < I$.

224. (New) The apparatus of claim 223, wherein

the apparatus is configured to use the data channels such that the data channels are spread by the one or more orthogonal variable spreading factor codes.

225. (New) The apparatus of claim 223, further comprising

an in-phase branch and a quadrature-phase branch, wherein

at least the first one of the data channels and the third one of the data channels are coupled to the in-phase branch, and

at least the second one of the data channels and the at least one control channel are coupled to the quadrature-phase branch.

226. (New) The apparatus of claim 225, further comprising:

a fifth spreading unit configured to spread a fourth one of the data channels by $C_{4,3}$, wherein

the first one of the data channels, the second one of the data channels, the third one of the data channels, and the fourth one of the data channels are configured to be used when four and not more than four of the data channels are used, and

the fourth one of the data channels is coupled to the quadrature-phase branch.

227. (New) The apparatus of claim 226, further comprising:

a sixth spreading unit configured to spread a fifth one of the data channels by $C_{4,2}$; and

a seventh spreading unit configured to spread a sixth one of the data channels by $C_{4,2}$, wherein

the first one of the data channels, the second one of the data channels, the third one of the data channels, the fourth one of the data channels, and the fifth one of the data channels are configured to be used when five and not more than five of the data channels are used,

the first one of the data channels, the second one of the data channels, the third one of the data channels, the fourth one of the data channels, the fifth one of the data channels, and the sixth one of the data channels are configured to be used when six of the data channels are used,

the fifth one of the data channels is coupled to the in-phase branch, and

the sixth one of the data channels is coupled to the quadrature-phase branch.

228. (New) The mobile station of claim 227, further comprising:

a spreading code generation unit configured to generate $C_{4,1}$, $C_{4,2}$, $C_{4,3}$, and $C_{256,0}$.

229. (New) A mobile station, wherein the mobile station is configured to use a plurality of data channels to be spread by one or more orthogonal variable spreading factor codes each having a spreading factor of four and at least one control channel, comprising:

an allocation unit configured to allocate first data to a first one of the data channels, second data to a second one of the data channels, third data to a third one of the data channels, fourth data to a fourth one of the data channels, fifth data to a fifth one of the data channels, and sixth data to a sixth one of the data channels, and control data to the at least one control channel, respectively;

a first multiplier configured to spread the first data by $C_{4,1}$;

a second multiplier configured to spread the second data by $C_{4,1}$;

a third multiplier configured to spread the third data by $C_{4,3}$;

a fourth multiplier configured to spread the fourth data by $C_{4,3}$;

a fifth multiplier configured to spread the fifth data by $C_{4,2}$;

a sixth multiplier configured to spread the sixth data by $C_{4,2}$; and

a seventh multiplier configured to spread the control data by $C_{256,0}$, wherein

the first one of the data channels and the second one of the data channels are configured to be used when two and not more than two of the data channels are used,

the first one of the data channels, the second one of the data channels, and the third one of the data channels are configured to be used when three and not more than three of the data channels are used,

the first one of the data channels, the second one of the data channels, the third one of the data channels, and the fourth one of the data channels are configured to be used when four and not more than four of the data channels are used,

the first one of the data channels, the second one of the data channels, the third one of the data channels, the fourth one of the data channels, and the fifth one of the data channels are configured to be used when five and not more than five of the data channels are used, and

the first one of the data channels, the second one of the data channels, the third one of the data channels, the fourth one of the data channels, the fifth one of the data channels, and the sixth one of the data channels are configured to be used when six of the data channels are used, and

$C_{I,K}$ represents an orthogonal variable spreading factor code, I being a spreading factor and K being a code number, wherein $0 \leq K < I$.

230. (New) The mobile station of claim 229, further comprising:

an in-phase branch and a quadrature-phase branch, wherein

at least the first one of the data channels, the third one of the data channels, and the fifth one of the data channels are coupled to the in-phase branch, and

at least the at least one control channel and the second one of the data channels, the fourth one of the data channels, and the sixth one of the data channels are coupled to the quadrature-phase branch.

231. (New) The mobile station of claim 230, further comprising:

a spreading code generation unit configured to generate $C_{4,1}$, $C_{4,2}$, $C_{4,3}$, and $C_{256,0}$.

232. (New) The mobile station of claim 229, wherein

the mobile station is configured to use the data channels such that the data channels are spread by the one or more orthogonal variable spreading factor codes.

233. (New) An apparatus for a mobile communication system, wherein the apparatus is configured to use a plurality of data channels to be spread by one or more orthogonal variable spreading factor codes each having a spreading factor of four and at least one control channel, comprising:

an allocation unit configured to allocate at least first data to a first one of the data channels, second data to a second one of the data channels, and third data to a third one of the data channels;

a spreading unit configured to spread at least the first data by $C_{4,1}$, the second data by $C_{4,1}$, the third data by $C_{4,3}$, wherein

the first one of the data channels, the second one of the data channels, and the third one of the data channels are configured to be used when three and not more than three of the data channels are used, and

$C_{I,K}$ represents an orthogonal variable spreading factor code, I being a spreading factor and K being a code number, wherein $0 \leq K < I$.

234. (New) The apparatus of claim 233, further comprising:

an in-phase branch and a quadrature-phase branch, wherein

at least the first one of the data channels and the third one of the data channels are coupled to the in-phase branch, and

at least the second one of the data channels is coupled to the quadrature-phase branch.

235. (New) The apparatus of claim 233, wherein

the allocation unit is further configured to allocate control data to the at least one control channel, and

the spreading unit is further configured to spread the control data by $C_{256,0}$.

236. (New) The apparatus of claim 235, further comprising:

an in-phase branch and a quadrature-phase branch, wherein

at least the first one of the data channels and the third one of the data channels are coupled to the in-phase branch, and

at least the at least one control channel and the second one of the data channels are coupled to the quadrature-phase branch, wherein

the apparatus is configured to use the data channels such that the data channels are spread by the one or more orthogonal variable spreading factor codes.

237. (New) A mobile station, wherein the apparatus is configured to spread at least one or more data channels by one or more orthogonal variable spreading factor codes each having a spreading factor of four, comprising:

a spreading unit configured to spread at least a first one of the data channels by $C_{4,1}$, a second one of the data channels by $C_{4,1}$, and a third one of the data channels by $C_{4,3}$, wherein

the first one of the data channels, the second one of the data channels, and the third one of the data channels are configured to be spread by the one or more orthogonal variable spreading factor codes when three and not more than three of the data channels are spread by one or more orthogonal variable spreading factor codes, and

$C_{I,K}$ represents an orthogonal variable spreading factor code, I being a spreading factor and K being a code number, wherein $0 \leq K < I$.

238. (New) The mobile station of claim 237, further comprising:

an in-phase branch, at least the first one of the data channels and the third one of the data channels being coupled to the in-phase branch, and

a quadrature-phase branch, at least the second one of the data channels being coupled to the quadrature-phase branch.

239. (New) The mobile station of claim 238, wherein

the spreading unit is further configured to spread a control channel, the control channel being coupled to the quadrature-phase branch.

240. (New) A mobile station, wherein the apparatus is configured to use at least one or more data channels to be spread by one or more orthogonal variable spreading factor codes each having a spreading factor of four, comprising:

a first spreading unit configured to spread at least a first one of the data channels by $C_{4,1}$ and a third one of the data channels by $C_{4,3}$;

a second spreading unit configured to spread at least a second one of the data channels by $C_{4,1}$,

the first one of the data channels, the second one of the data channels, and the third one of the data channels are configured to be used when three and not more than three of the data channels are used, and

$C_{I,K}$ represents an orthogonal variable spreading factor code, I being a spreading factor and K being a code number, wherein $0 \leq K < I$.

241. (New) The mobile station of claim 240, further comprising:

an in-phase branch, at least the first one of the data channels and the third one of the data channels being coupled to the in-phase branch, and

a quadrature-phase branch, at least the second one of the data channels being coupled to the quadrature-phase branch.

242. (New) The mobile station of claim 241, wherein

the second spreading unit is further configured to spread a control channel, the control channel being coupled to the quadrature-phase branch, and

the mobile station is configured to use the data channels such that the data channels are spread by the one or more orthogonal variable spreading factor codes.

243. (New) A method for a mobile station, wherein the mobile station transmits at least three data channels to be spread by one or more orthogonal variable spreading factor codes each having a spreading factor of four and at least one control channel, comprising:

spreading a first one of the data channels by $C_{4,1}$;

spreading a second one of the data channels by $C_{4,1}$; and

spreading a third one of the data channels by $C_{4,3}$; wherein

when the mobile station transmits three and not more than three of the data channels, the first one of the data channels, the second one of the data channels, and the third one of the data channels are transmitted, and

$C_{I,K}$ represents an orthogonal variable spreading factor code, with I being a spreading factor and K being a code number, wherein $0 \leq K < I$.

244. (New) The method of claim 243, wherein

$C_{4,1}$ represents {1, 1, -1, -1} and $C_{4,3}$ represents {1, -1, -1, 1}.

245. (New) The method of claim 243, further comprising:

spreading the at least one control channel by $C_{256,0}$.

246. (New) The method of claim 245, wherein

at least the first one of the data channels and the third one of the data channels are coupled to an in-phase branch, and

at least the at least one control channel and the second one of the data channels are coupled to a quadrature-phase branch.

247. (New) The method of claim 245, further comprising:

assigning the first one of the data channels and the third one of the data channels to an in-phase branch; and

assigning the at least one control channel and the second one of the data channels to a quadrature-phase branch.